Competency 4.5 **Industrial hygiene personnel shall demonstrate the ability to apply recognized industrial hygiene evaluation criteria and methods to reduce the risk of occupational disease or illness.**

1. Supporting Knowledge and/or Skills

a. Perform a facility/operation industrial hygiene compliance assessment that includes the following:
- Health hazard identification
- Health hazard exposure assessment
- Engineering control method(s) evaluation
- Personal protective equipment/program evaluation
- Work practice evaluation
- Record keeping and reporting procedures

b. Discuss the importance of management commitment and worker involvement and the criteria used to evaluate these program factors to the following:
- Deficiency resolution
- Self-assessment
- Issues management
- Conduct of operations
- Hazard identification and evaluation
- Hazard reporting and disposition of employee concerns
- Trending and analysis
- Procedures development
- Resource allocation (dollars, personnel, equipment)

c. Review a quality assurance program related to the industrial hygiene program and activities. Analyze the program for:
- Independent verification
- Sampling methods and chain of custody
- Laboratory accreditation
- Documentation
- Quality assurance implementation plan/procedures

2. Recommended Reading

Review

- The index, and/or the table of contents, for each of the following:
  - 40 CFR 763, "Asbestos"
  - ANSI Z88.2, "Practices for Respiratory Protection"
  - ANSI Z88.6, "Respiratory Protection, Respirator Use, and Physical Qualifications for Personnel"
  - ANSI Z136.1, "Safe Use of Lasers"
  - ANSI Z117.1, "Safety Requirements for Working in Tanks and Other Confined Spaces"
  - ANSI Z358.1, "Emergency Eyewash and Shower Equipment"
  - ANSI C95.1, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100GHz"
  - ACGIH, 1995-1996 (or current), Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
- The index of 29 CFR 1910, "Occupational Safety and Health Standards," to gain a familiarity with the general organization and content of the document.
- The index of 29 CFR 1926, "Safety and Health Standards," to gain a familiarity with the general organization and content of the document.
- AIHA, *A Strategy for Exposure Assessment*.
- DOE Guide 440.1-3, *Occupational Exposure Assessment* (Draft for Interim Use and Comment).
- DOE Policy 450.2 Interim Policy, *Policy Statement on the Identification and Compliance With Environment, Safety, and Health Requirements*.
- *Fundamentals of Industrial Hygiene*, 3rd Edition or later, National Safety Council, Chapters 16, 17, 18, and 19.
- OSHA *Technical Manual*, 2nd Edition and/or later, U.S. Department of Labor, Occupational Safety and Health Administration.
- NIOSH *Occupational Exposure Sampling Strategy Manual*, NIOSH Pub. No. 77-173.
- Patty's *Industrial Hygiene and Toxicology*, Volume IIIA (2nd Edition), Chapter 8, "Statistical Design and Data Analysis Requirements," Chapter 11, and Chapter 12, "Philosophy and Management of Engineering Controls," and Volume IIIB, Chapter 7, "Interpreting Exposure Levels to Chemical Agents," Clayton & Clayton.
- Patty's *Industrial Hygiene and Toxicology*; 4th Edition; Volume I; Chapters 15, "Quality Control;" 16, "Calibration;" and 27, "Industrial Hygiene Sampling and Analysis;" Clayton & Clayton.

3. Summary

This competency generally readdresses topics already covered in competencies 1.4 through 1.8, 2.1, 4.1, and 4.2 of this study guide; however, a few points are worth reemphasizing with respect to evaluation criteria and reducing the risk of occupational disease and illness.

One of the fundamental principles of industrial hygiene is that if personnel are prevented from being exposed to concentrations of a harmful agent above a criterion level, then occupational illness will not result. For this reason, allowable exposure levels are established, and personal monitoring is performed in order to determine exposure relative to the standards.

While the assumption about overexposure is probably generally true, the exceptions to this rule are frequent and important. For example, the TLVs are described as protecting most healthy workers from serious or irreversible damage, indicating that regular exposure at the TLV may cause serious irreversible damage to some healthy workers. To unhealthy workers, the TLVs are even less protective, and the TLVs do not protect against health effects not classified as serious or irreversible. Actual exposure levels should, therefore, for many substances, be kept to a reasonable minimum and the presence of illness or symptoms should be monitored (either by the industrial hygienist or occupational medicine) in certain exposed groups, even though exposure under the allowable limits is ensured.

Any well-designed program for controlling occupational illness will include both continuing workplace surveillance and sampling by industrial hygiene staff as well as the interview or surveillance of groups of workers having significant exposure patterns, irrespective of their failure to exceed exposure to a criterion level. Exactly what level of industrial hygiene surveillance and sampling is required, what exposure levels should be used as indicators of trouble, and which groups of workers should be interviewed or examined; how, and at what frequency, will ultimately depend on the assessment of risk made by technical personnel, but also level of resources available, and the relative demands made on these resources by other industrial hygiene and occupational medicine requirements.

4. Suggested Exercises

Please refer to Scenarios 2, 4, 8, 9, and 10 in the Scenario section of this document.